Matthew H. Bronars

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EDUCATION

Georgia Institute of Technology, School of Interactive Computing   *May 2022 – PRESENT*
Master of Science: *Computer Science*
Concentration: Computational Perception and Robotics
Cumulative GPA: 4.0/4.0

University of California Berkeley, College of Engineering   *Aug 2017 – May 2022*
Bachelor of Science: *Electrical Engineering and Computer Science (EECS) & Mechanical Engineering*
Commendations: Deans List (Fall 2020), Certificate in Design Innovation
Cumulative GPA: 3.7/4.0
Notable Coursework
Deep Learning, Machine Learning, Artificial Intelligence, Machine Learning with Limited Supervision, Human Robot Interaction, Multi-Robot Systems, Convex Optimization, Efficient Algorithms

RESEARCH EXPERIENCE

Graduate Research Assistant – *Danfei Xu*, Georgia Tech   *Aug 2022 – PRESENT*
- Researching offline imitation learning, representation learning, and data driven approaches to human robot interaction
- Currently studying guided diffusion policies for robotics and autonomous generation of legible robot motion
- Interests include safe human robot interactions, learning from suboptimal/unstructured data, and active learning

Undergraduate Research Assistant – *Lydia Sohn*, UC Berkeley   *Aug 2020 – May 2022*
- Automated analysis of stem cell data by implementing a pipeline for instance segmentation and object tracking
- Annotated and cleaned an internal training dataset then finetuned the parameters of a U-Net CNN

PROFESSIONAL EXPERIENCE

Machine Learning Intern – Symbotic   *May 2023 – Aug 2023*
- Analyzed correlations between robot failures and structural locations. Wrote procedures for validation data collection.
- Designed, implemented, and deployed machine learning models for classifying structural failures.

Computer Vision Intern – Schlumberger Doll Research   *May 2021 – Dec 2021*
- Built and trained a neural network for visual failure detection. Made a pipeline for semi-supervised data collection.
- US patent pending: Cable Damage Detection by Machine Vision

Robotics Intern – National Security Innovation Network   *May 2020 – Sept 2020*
- Designed, specified, and constructed a prototype UAV based on constrains set by the Department of the Navy.

PAPERS

M. Bronars, S. Cheng, D. Xu, "Legibility Diffuser**:** Offline Imitation for Intent Expressive Motion." *Preprint*
- TLDR; We generate legible robot motion by training a guided diffusion-based policy on multi-modal human demonstrations. This end-to-end approach does not require hand designed cost functions or classical motion planners.

S. Kuhar, S. Cheng, S. Chopra, **M. Bronars**, D. Xu, "Learning to Discern: Imitating Heterogeneous Human Demonstrations with Preference and Representation Learning." *Conference on Robot Learning* **(***CoRL) 2023*
- TLDR; Learning to Discern (L2D) is an imitation learning framework for learning from suboptimal demonstrations. Training a quality critic in a learned latent space allows L2D to effectively generalize to unseen demonstrators.

M. Bronars and D. Xu, "Legible Robot Motion from Conditional Generative Models." *International Conference on Machine Learning (ICML) 2023, Interactive Learning with Implicit Human Feedback Workshop*
- TLDR; We introduce Generative Legible Motion Models, a framework that utilizes conditional generative models and rejection sampling to generate legible robot motion from human demonstrations.

MISC

Graduate Teaching Assistant – Deep Learning & Deep Learning for Robotics   *Aug 2023 – PRESENT*
- At Georgia Tech, I created an assignment on generative models (theory and coding) for the deep learning class.

Robomimic Development Team   *Dec 2022 – PRESENT*
- Assisted in the implementation, benchmarking, and documentation of transformer based behavioral cloning.
- Currently adding environment parallelization and implementing metrics/procedures for multi-task evaluation